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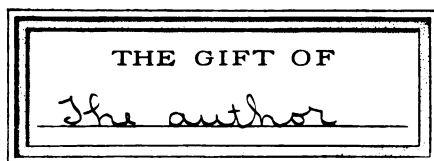
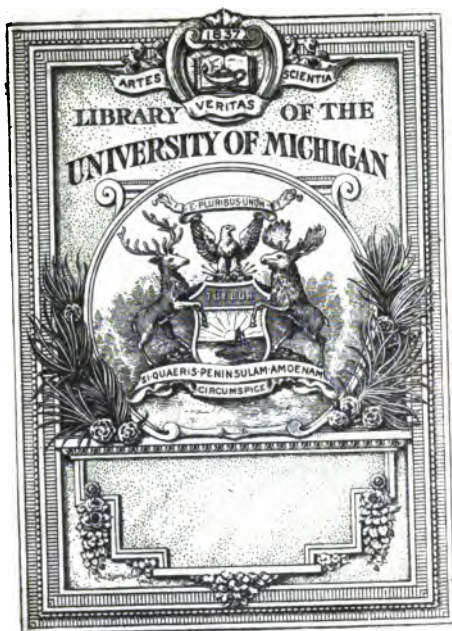
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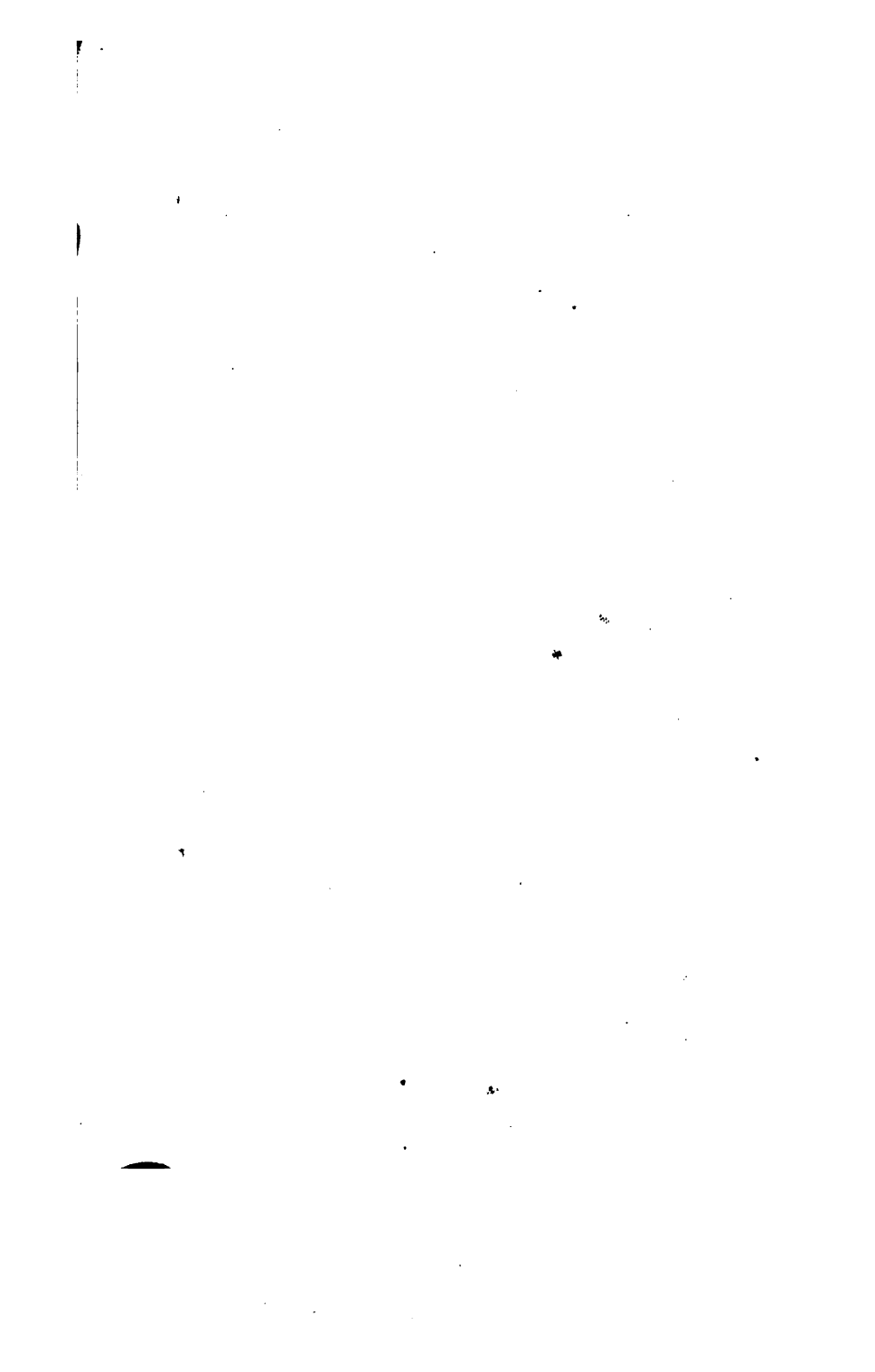
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IN DEFENSE OF THE ATTENUATED DRUG.

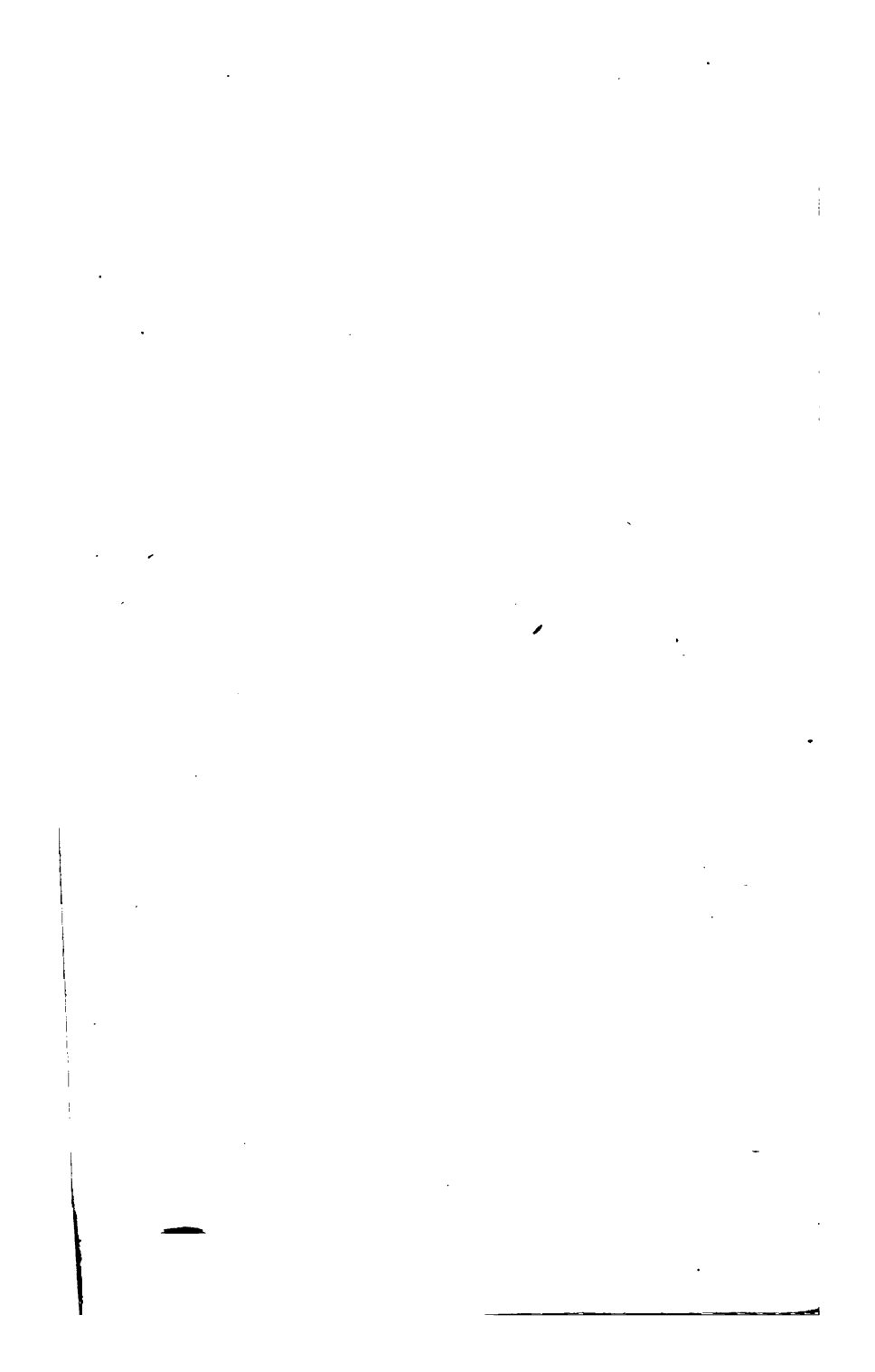
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IN DEFENSE OF THE ATTENUATED DRUG.

BY ROYAL S. COPELAND, A. M., M. D., ANN ARBOR,
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"GRANTED THE REMEDIAL POWER OF A DRUG ATTENUATED BEYOND ITS DEMONSTRABLE DIVISIBILITY OF DRUG-MATTER, WHEREIN AND WHY IS THE REMEDIAL ACTION OF SUCH ATTENUATED DRUG SUPERIOR OR MORE EFFECTIVE THAN THE ACTION OF A DRUG ATTENUATED, BUT NOT BEYOND THIS DEGREE?"*

In the discussion of this subject, I shall assume that the language of the title referring to attenuation, "beyond demonstrable divisibility of drug matter," applies to the possibility of such demonstration by physical and chemical means understood and practiced up to about 1890. The modern methods, particularly the electro-chemical methods, have made it possible to discover drug matter in such dilution as heretofore carried the attenuation beyond demonstrability. It is not unreasonable to suppose the future may reveal other methods which

*Under this title, in a symposium on "potency," the following thesis was presented at the Niagara Falls meeting of the American Institute of Homœopathy, June 23, 1904. Since its reading the paper has been revised and the bibliography completed.

will detect drug-matter in attenuation beyond the point where all physical evidences now fail to reveal its presence. At the outset, I must confess that such attenuation as actually removes the physical presence of the drug does not appeal to me as capable of having any possible remedial effect. I am not prepared to say whether the actual presence ceases at the thirtieth, the two hundredth, the five hundred thousandth, the millionth potency, or at a point more remote. Of the value of such dilutions, clinical testimony alone is in evidence, and, at best, that is more or less unreliable. Future generations, possessing more exact knowledge, will know more of this subject. I do believe, however, that drugs attenuated far beyond the demonstrable divisibility of fifteen years ago have an action, which I hope to prove is more effective than the action of drugs prescribed in more concentrated form.

In order to discuss this question with any degree of intelligence, we must establish some cardinal propositions. Some conclusions may thus be reached which are true or not according to the reliability of the original statements. These propositions place the whole theory of disease and therapeutics upon a chemical foundation.

To the Homœopathist, there is a measure of satisfaction in the prevalent trend of thought in the dominant school, and in the scientific world at large. The work of Ehrlich, of Arrhenius, of Ostwald, and of others, has caused us to read Hahnemann's views with renewed interest. Through Hufeland's Journal, in 1796, Hahnemann promulgated a new prin-

ciple for ascertaining the curative power of drugs. In this essay, he considered the prevalent theories of his time as they related to the subject. He demonstrated their worthlessness, first, by overthrowing that one which proposed to determine the medicinal power of a drug by mixing it with newly drawn blood to see the effect upon the color and consistency of the fluid. Then he disposed of the attempt to classify remedies by the color of the plants, the odor of their flowers, and the taste of their juices. He disproved the doctrine of botanical affinity, by which plants of the same family were supposed to have practically the same drug action. Of the medical profession, who, previous to his time, "almost unanimously denied all value to chemistry in the search for the medical power of drugs, and the discovery of remedial agents for the diseases to which humanity is liable," Hahnemann in the *Lesser Writings* said: "In this, they probably went too far. Although I am far from conceding to the chemical art a universal influence on the *Materia Medica*, I cannot refrain from alluding to some notable discoveries in this respect which we have to thank it for, and to what it may hereafter effect for therapeutics."*

We have, then, most illustrious precedent in looking to chemistry for help in solving the great problem of therapeutics. With this introduction we will at once proceed to state our propositions, and, later, attempt to prove them.

**Lesser Writings*, p. 250.

Propositions Stated.

1st. The cell is the morphological unit of life.

2d. The chief manifestation of cell activity is its power of metabolism, and all its activities are brought about, or are accompanied by definite chemical changes.

3d. Cells possess selective affinities for certain chemical, or chemical reactions.

4th. The body possesses natural protective forces, largely chemical, especially resident in the blood.

5th. Disease is a disturbance of the chemical equilibrium of the cell, resulting in an interference with its power of metabolism.

6th. A remedy is anything which, by its action upon a diseased cell, causes it to resume a condition of equilibrium.

7th. A drug is a remedy which is effective by reason of its chemical action, and not by reason of any mystical "force," or other intangible quality.

8th. Substances are more active chemically the finer they are divided.

9th. The remedy should be given with such accuracy of selection and dose and in such form as to aid the disturbed cell, without interfering with the protective forces of the body, or impairing the functions of other cells.

10th. The attenuated drug, without interference with the normal cells, or body fluids, offers the remedy in a form ready for instant appropriation by the disturbed cell, and, hence, in the cure of disease, is more effective than any other possible practice.

The Cell and Its Functions.

Before taking up a discussion which of necessity touches the structure of the body and intimately relates to the ultimate elements of that organization, a brief review of the cell and its functions may not be amiss.

The cell is the morphological unit of life. We arrive at this conclusion from the fact that in the definite structure which we term a cell are seen all the general manifestations of life, and, as yet, science has been unable to find any simpler structure which shows activity.

The sizes of various cells differ greatly, but, with the largest one, we are dealing with a microscopical object. When one begins to estimate the size of a cell and to compute the number to be found in one human being, he is overwhelmed by the magnitude of his task. In the liver, for instance, the cell ranges in size from seventy-five to one hundred cubic microns. The micron measuring about the twenty-five thousandths of an inch, it is estimated that a cubic inch of liver contains about 156,000 million cells. Accepting Gautier's estimate that the white-of-egg molecule contains five or six thousand atoms and that the liver cell is four thousand times the diameter assumed for the albumen molecule, the number of living units in a single microscopic liver cell must be placed at above 64,000 millions, and the total number of atoms at around 300 million millions.

It is not a far cry to state that any drug to be of possible value to such an infinitesimal organism must be presented in most minute form.

Cell Metabolism.

The manifestations of cell activity are for the most part concerned in its metabolism. On the one hand, we notice anabolism, the building up and storing of material concerned in the maintenance of the cell, or, as we usually term it, the supplying of waste. This is a synthetic process, and while we do not as yet understand the exact changes going on in the cell, we are, in a number of instances, able to follow this process as carried out by groups of cells. For example, the liver cells take up the sugar from the portal blood and synthesize it into higher saccharides, glycogen, or animal starch. On the other hand, there is katabolism which has to do with the breaking down of the cell protoplasm into simpler chemical compounds; thus, the active muscle forms from the glycogen lactic acid and carbon dioxide. Carbon dioxide is a constant product of the process. It is interesting to observe that it is possible to measure the extent of the katabolism by the amount of carbon dioxide formed.

We note that these evidences of activity are accompanied by definite chemical changes. There can be no change from potential to kinetic energy without a chemical change of some sort. Whether we can ascribe the cause of activity of a cell to chemical change, or the chemical change to be a result of the cell activity, is a question which is, as yet, an open one. But it is certain that activity and chemical changes are inseparable, and under normal conditions, these changes are definite and constant. Even in such highly specialized organs as are nerve cells,

where there is no known product from their metabolism, such as that from the liver cells, we have an absolute proof, in the change of electro-potential, that an active nerve cell is involved in chemical change. We are almost ready to state positively that nerve function, even, is caused by a chemical decomposition within the cell.

The normal cell has going on simultaneously the processes of katabolism and anabolism, and under the condition which we know as health, these processes are equalized, waste is at once replaced and a balance is maintained. Inasmuch, then, as the process of metabolism is a chemical one, we can think of the normal cell as being one in a state of chemical equilibrium.

Selective Affinity of Cells.

The pharmacologist has abandoned the idea that drugs have an "elective affinity" for certain parts of the body, and, in common with all scientific thinkers, now holds to the belief that the cells themselves have a selective affinity, or, in the new language, a "tissue proclivity" for certain chemicals, or chemical reactions.

That this theory has a reasonable basis is shown by many very interesting facts. For instance, silver taken into the system is not found in the general endothelium, but only in the endothelium of the vessels of the choroid plexus at the base of the brain. Strychnia affects the cells between the motor neurons and sensory neurons of the spinal cord and does not affect either of the two, even though the cells are

the same histologically. Carbon is found in the connective tissue of the joints and lungs, but not in the connective tissue of the kidney, or in the stroma of other organs, histologically the same. Tetanus toxin acts upon the motor nerve cells and nicotin upon the ganglion cells of the sympathetic system. Every homœopathic physician is familiar with the effect of serpent's venom upon the blood, now recognized to be a hæmolytic action upon the red corpuscles.

It would be interesting to review many similar facts, but these examples are sufficient to show the selective affinity of the cells for certain chemicals or chemical reactions. Professor Ehrlich, in the Herter lectures of this year, attempting to show the relation of the cell receptors to metabolism, spoke of the independent individuality of the protoplasm. He used a homely illustration which shows the selective affinity of certain cells and their ability to search out and appropriate the particular element especially agreeable to them. When wool is immersed in a dilute solution of picric acid there is a concentration of the dye and a color is imparted to the wool which is not given to other substances immersed even in a more concentrated solution of the acid.

This selective affinity of cells, due probably to their specialized metabolism, has an important bearing on the life of the individual. The liver cells store up glycogen as a food reserve. Other cells have an affinity for waste products and are concerned in elimination. But to us this tissue pro-



clivity has a greater significance. It accounts for the appropriation of drug substance, no matter how infinitesimal, by the cells demanding that particular element.

Immunity and Ehrlich's Theory.

It is an accepted idea that the body fluids, particularly the blood serum, possess certain protective functions. We hear much these days of "immunity." Relating to this subject, the most popular current theories have a chemical foundation. Their fundamental principle is that the blood-serum may be so modified as to overcome the effects of infections, of poisons, or of both. This is done by destroying the bacteria, known as bacteriolytic power, or by counteracting the toxins developed, known as antitoxic power. That one known as Ehrlich's "side-chain" theory is most discussed. It attempts to explain antitoxic immunity in chemical terms. Ehrlich assumes that the cell body has upon it a number of side-chains—receptors as they are termed. These are capable of combining with food products for the metabolism of the cell, but may combine with toxic products, with damage to the cell. According to this theory, antitoxins, consisting of surplus receptors made by the cell and cast off in the blood stream, unite with the toxin in the serum, leaving the other receptors of the cell free for their normal food-taking properties.

Ehrlich's theory is extremely complicated. Without any attempt to review all its details, I desire simply to mention the fact that in the successful

maintenance of this hypothesis much ingenuity has been shown by its author. To show how the complement, or anti-body, does its work, he explains the necessity for the presence of certain intermediary bodies, or amboceptors. The protective action of the blood may be interfered with, then, by drug effect upon the cell, interfering with the production of receptors, upon the amboceptor, or upon the complementary body. The importance of this, therapeutically, will be considered later.

Prudden says: "There seems to be abundant ground for the belief that the protective agencies which are evoked in both natural and artificial immunization are simply those which the body makes use of in its normal metabolism, exaggerated and diverted to different ends, it is true, in the face of emergencies, but giving evidence of the birth of no new physiological capacities."

These theories show the importance of preserving the protective properties of the blood serum and have a bearing upon the drug administration. Of this we will say more directly.

Theory of Solution.

New light upon the positive value of the infinitesimal dose, showing its chemical power, has been shed by the advances made in physicial chemistry during the past decade. In 1898 and again in 1903, by Prof. Bailey* first, and later by Dr. Gatchell,† the

*Transactions American Institute of Homœopathy, 1898, pp. 44, 54.

†Ibid, 1903, p. 82.

Ostwald and Arrhenius theories of solution were considered at some length by this body. In reading the Transactions and noting carefully the discussions of these able papers, the impression was made upon my mind that it is important to correct some misapprehensions regarding these theories and their relation to our practice. Your speaker does not presume to pose as a chemist capable of critical examination of the members of this body, but having the written testimony before him, he has taken advantage of expert assistance to amplify and clarify the subject and so reopen the discussion of what certainly is a very interesting development of physical chemistry as it relates to the infinitesimal dose.

To bring this phase of the subject clearly to mind, let us briefly state the so-called theory of dissociation of molecules. As interpreted by this theory, a chemical, technically an electrolyte, when dissolved, is dissociated into parts or particles smaller than the molecules and known as ions. The more dilute the solution the greater is the dissociation and consequently the molecules are less in number and the ions increased. In a solution infinitely dilute, the dissociation is absolute and the chemical is present only in a state of ionization.

When this subject was newly presented the first question which occurred to most of us was: How dilute must the solution be in order to bring about complete dissociation? If it were a solution of Sodium chloride, for instance, what dilution, according to our nomenclature, would furnish complete ionization? The search for facts on this subject revealed

Lord Kelvin's statement as to the size of a molecule. He says: "Imagine a rain drop or a globe of glass as large as a pea, to be magnified up to the size of the earth, each constituent molecule being magnified in the same proportion. The magnified structure would be coarser grained than a heap of small shot, but probably less coarse grained than a heap of cricket balls." In order to reach, then, a solution sufficient to bring about dissociation of the molecule itself, it is readily seen that the volume of the solvent used must be immense. Having quoted Kelvin, Jones† states that "perhaps the best demonstration of the almost unlimited divisibility of matter is furnished by some of the aniline dyes, or by fluorescein, where one part is capable of coloring or rendering fluorescent at least one hundred million parts of water." This solution corresponds to at least the eighth decimal dilution. The authorities‡ agree that the dissociation increases with the dilution, from the most concentrated solutions up to a dilution of about one one-thousandth normal. It is safe to assume, therefore, that dissociation of the simplest drug is not complete under the sixth decimal dilution.

It is easily seen, then, that complete ionization is possible only in infinitesimal dilution. Not only is this true in theory, but also the research of the chemist seems to prove it. We are prepared, then, to assume that the therapeutic value of the drug is not lost when it is placed in such dilution as to rep-

†Physical Chemistry (1902), p. 40.

‡Ibid. p. 216.

resent an amount less than any assignable or measurable quantity.

Objections to the Theory.

To revert for a moment to the discussion of last year, it is my purpose to attempt to clear up some questions which, in the press of time, then, apparently passed unanswered. Dr. Wesselhøft, as quoted in the Transactions, said:† "Undoubtedly much light was shed on the physical properties of matter by the discovery of the principle of dissociation; but this, instead of confirming our proposition of increased activity by dilution, seems to me to somewhat to disturb it. Not but that the pathogenic power of drugs may not be increased, but an entirely new character and effect is imparted to them, of which, as yet, it is impossible to conceive the nature.

"Take, for instance, the example of potassium chloride," he said, "this after dissociation is no longer KCl, but consists of water having in solution ions of K and of Cl. Now, according to all of our former accepted knowledge, potassium is a very different body from chlorine. Both united furnish a third, potassium chloride, which is very different from each of its two components. This illustration is more convincing when we consider sodium chloride, or common salt, and how widely different this is from either of its two constituents. If we wish to get a patient under the influence of potassium chloride, or of sodium chloride we would not pre-

†Transactions American Institute of Homœopathy, 1903, p. 92.

scribe either chlorine by itself, or potassium, or sodium by themselves.

"Another suggestion occurs to me," Dr. Wesselhœft states further, "and that is, not to carry dissociation (dilution) beyond the molecular limit, because, when our molecule is broken up, we cannot expect the same pathogenic or therapeutic effect that we ought to get from the undissociated molecule. . . . We should discover the limit at which dissociation begins with regard to every medicinal substance we make use of, and then we should be very careful not to go too far beyond it."

Objections Answered.

I know the kindness of Dr. Wesselhœft's heart and the broadness of his view; he will not take offense if I reply to this criticism of the theory of dissociation as it relates to Homœopathy. I should discuss the matter in private with the Doctor were it not for the fact that the same criticism has been made by others, and it is of such importance that it should be settled to the satisfaction of the profession, and, if possible, to the advantage of our own position in the scientific world.

First, the criticism fails in the light of clinical experience. This argument needs but the mentioning; every physician here can testify to cures made with remedies in such dilution as certainly to be far beyond the beginning of dissociation, and probably beyond complete ionization.

Then, the laboratory has proven that the properties of completely dissociated solutions are the sum

of the properties of all the ions present in the solution.* In other words, the properties are additive. This holds for such properties as conductivity, lowering of freezing point, refraction equivalent, heat of neutralization, and, undoubtedly, for any therapeutic effect possessed by the drug.

Furthermore, any solution of a drug, no matter how concentrated, presents some at least of its molecules in a dissociated form. Therefore, Dr. Wesselhœft's criticism would apply as well to the tincture as to the highest potency, but it is hardly valid for either.

The consensus of opinion today, based on chemical experiment, is that the finer the division of a chemical substance the more active it is, though unchanged in the quality of its reactions. In its state of complete ionization, its line of direction is not changed but its activity is multiplied; it is altered not in kind, but in degree merely. Furthermore, the physiological efficiency of any drug is not a fixed quality except in infinite dilution. By means of solution we get the most complete division, and in infinitesimal dilution is found the most powerful chemical action. Thus, in this new century, is scientifically verified a statement made by Samuel Hahnemann, who said: "The effect of a Homœopathic dose is augmented by increasing the quantity of fluid in which the medicine is dissolved preparatory to its administration."

*Mémoire by Svante Arrhenius in the "Modern Theory of Solutions," pp. 57 and 58.

• **‘Vital Force’ Abandoned.**

It is a digression possibly, but I desire at this point to touch upon another matter, which, if true, may come as a revelation to many of our profession. If the theory of dissociation be correct, many of us have erroneously, or, at least, imperfectly, applied the remedy, even though the selection in theory was absolutely in accord with the law of similars. You may well ask why this statement is made. Now to the proof.

Granted that the dilution of the remedy increases its power, it is not by reason of the Hahnemannian theory of “dynamization,” as it is ordinarily understood.

Let it be said in passing, however, that Hahnemann, in paragraph 288 of the *Organon*, spoke of this force not as a spirit force, but his language was “spirit-like force,” quite a different thing. This idea of “force” influenced and permeated all branches of science. The physiologist was the last to break away from the old theory of “vital force” and to explain all the bodily processes in chemical terms. The idea of a mystical force being possessed by drugs was but the outgrowth of the vitalistic theories of life and disease. The brilliant work of Wohler and Liebig, and especially of Berthelot, in synthetic chemistry, has cast off this yoke and no longer is it necessary for the Homœopathist, or any other scientist, to explain temporarily unknown quantities on the basis of some ether, spirit or humor. There is a more rational hypothesis which is acceptable to all

the rest of the scientific world. With the present state of our knowledge, it is unnecessary to fall back upon a mysterious "dynamis." Homœopathy, at least the infinitesimal dose, is as reasonable, as explainable, as scientifically sensible, as is any other of the natural sciences.

The Tablet Triturate.

To revert to our subject, in the light of modern science the power of the drug is increased by the dissociation of its molecules. Then, it certainly follows that the tablet triturate, as it is commonly used, rarely presents a single molecule of the drug it purports to carry. As I understand the manufacture of these tablets, the drug in dilution is poured over them and the tablets are then placed in an oven to dry. In the dry state, the liquid having evaporated, it is supposed that the tablet retains the drug in the form it had in solution. As a chemical proposition this is inconceivable. The drug, whatever it may be, has been so highly diluted that dissociation is more or less complete. It cannot be dreamed that an unsatisfied chemical bond or element could be perched in solitary grandeur upon some mountain of saccharum lactis and remain there in single blessedness. On the slopes of that mount, or from the atmosphere about it, it will surely find some other lonesome ion or atom, and will unite with it in wedlock, holy or unholy. If by any miracle of grace this marriage should result in the combination required, all well and good, but in practically every case the chemical resultant will be a new and quite different body.

For instance, take from its shelf the bottle containing tablets labelled *Argentum nitricum*. Invariably, in the lower potencies especially, where the change would be more apparent, the tablets will be found discolored, quite brown indeed. That color comes, not from the nitrate of silver, it is the oxide of silver. The molecules, or ions, of AgNO_3 , under the action of the atmosphere, have become Ag_2O , and the N has resumed its gaseous form.

If this is true of such a chemical, how much more true it must be of the more complex organic substances, like Aconite and Belladonna. Also such volatile bodies as hydrochloric acid and phosphorus, for instance, are frequently prescribed in tablet form. The latter body, when finely subdivided and exposed to the air, undergoes a chemical change with explosive violence. In solution, however, it is protected and remains as phosphorus. If for no other reason than to guard the drug from atmospheric, or other accidental contamination, or chemical conversion, the remedy is safe only in solution.

What is true of the tablet is equally true of the triturate where the latter is prepared by first pouring the dilution over sugar of milk. I am not so sure regarding triturates made from the metals, from drug substances, or from dried plants; possibly the drug by this method of preparation is simply finely subdivided. For myself, however, in the light of the modern theories of solution, I prefer the dilutions. If dispensed upon tablets, cones or pellets, they must be thoroughly saturated with the liquid, and enough left in excess to keep the drug

actually in solution. Otherwise, if the increased power of the drug depends on its dissociation and the presence of all its ions, both positive and negative, we might as well prescribe "moonshine."

Disease and the Infinitesimal Dose.

Having stated that health depends upon a condition of chemical equilibrium in the cells of the body, it naturally follows that if through any cause there is a disturbance of equilibrium there is at once a change of constants. The processes of metabolism are interfered with and we have a disturbance of function and even changes in structure. To illustrate: If there be a disturbance of the equilibrium of the parietal cells of the stomach, there is a failure in the production of hydrochloric acid. In malignant growths the chemical processes are so perverted that the cell metabolism is concerned only in reproduction; for instance, in the liver no bile is produced, but reproduction and abnormal growth result. In fatty degeneration there is such a disturbance of metabolism that the cell protoplasm is converted into fat.

If we can restore the equilibrium of the cell, or group of cells, we have remedied the abnormal condition and normal function will be resumed. A remedy is anything which will do this. This remedy may be rest, or stimulation, local application, or something else, but usually it is some drug administered for a specific effect upon the diseased condition. It is not for us, at this time, to discuss the rationale of the theory of similars in the selection of the drug, but rather to show why the drug is effect-

ive.* In the light of all present knowledge, we believe the drug acts by virtue of its chemical activities. Our knowledge being so meagre as to the actual reactions in the laboratory of the cell, it is difficult to follow the drug action, but we do know that almost without exception chemical substances introduced into the animal body are acted upon, more or less, and enter into and out of combination with the protoplasm of the cell. Some of the most stable of chemical substances are completely decomposed in the body. Enough has been positively determined in the laboratory to state that the animal body possesses chemical capabilities sufficient to deal with

*Did time and the scope of the subject permit, it would be interesting to record the experiments of Loeb and others, apparently demonstrating the truth of the theory of similars. It has been found, for instance, that the rhythmic contractions of muscle fibre, immersed in sodium chloride, or in calcium chloride solution, will cease after a time, a toxic condition of some sort being produced. Suppose the exhausted muscle is in the sodium solution, a small amount of calcium chloride, corresponding to the third or fourth decimal dilution, added to the solution containing the muscle, will cause the tissue to resume its contractions, to "cure" it, as it were. Thus is demonstrated the removal by a small quantity of a drug, symptoms similar to those produced by a large quantity of the same drug.

Is it not fair to count this and similar experiments as verifications of our theory of therapeutics? At another time we may enlarge upon this phase of the subject, as experimental work along this line is now being done.

the simplest, or most complex chemical problems, and that everything proceeds along definite and constant lines.

It having been shown that disease is a disturbance of chemical equilibrium and that remedies act chemically; it having been shown, further, that the most active form of drug is that which is presented in a state of complete ionization, then, it naturally follows that the remedy, to be acceptable to and instantly appropriated by the cell, must be given in a state of great attenuation.

With the system demanding relief and the symptoms calling for a certain drug, Barium chloride, for instance, I have no doubt that that drug given, high or low, in dilution or crude form, will thread its way through the blood stream and a sufficient quantity be appropriated by the disturbed cell to satisfy and correct its chemical equilibrium. But the experiments of Wenstrand and Hektoen have demonstrated that the ions of this particular drug combine with certain elements in the blood serum and to a great degree destroy its protective functions.

In their experiments sera showing decrease or absence of hæmolytic activity were all taken from patients extremely ill, or within twenty-four or forty-eight hours of death. "It seems, therefore," to use the words of Dr. Wenstrand, "as if the power of blood serum to dissolve foreign cells is lost at the same time as the power of the individual to resist death passes away. Consequently it would seem that the hæmolytic activity of a serum is, in a certain

manner, at least, a criterion of the resistance of an individual. This is borne out also by the finding of an increased hæmolytic activity in the serum of such patients whose resistance is high.”*

Hektoen† remarks that substances which suspend, diminish, or modify the bacteriolytic, hæmolytic, or other properties of the serum, favor the development of certain general infections, for instance, typhoid fever. It is not unreasonable, then, to presume that in the treatment of conditions where blood toxins are developed, in the administration of material quantities of Barium chloride, for instance, the symptoms calling for it may disappear, only to be replaced by conditions more serious, induced by a lowering of the protective forces of the body fluids. In the terms of Erlich’s hypothesis, this untoward effect is due to the action of the barium ions upon the complementary body of the serum. As a result, the immunizing properties of the blood are suspended, or at least greatly reduced. In the administration of a remedy for the relief of any disease, this fact must not be overlooked. The ideal prescription in the administration of a drug, is the minutest possible quantity to satisfy the disturbed cell, already shown to be infinitesimally small, in such dissociated condition as to make its appropriation the simplest possible chemical reaction, and in such form

*Wenstrand, Transactions Chicago Path. Soc., Vol. 5, No. 14, p. 294.

†See Transactions Chicago Path. Soc., Vol. 5. No. 14, p. 203.

as not to interfere with the protective forces of the body.

Conclusion.

For these reasons Hahnemann's advice, given a century ago, is pertinent today. In paragraph 276 of the *Organon* he says: "Too large a dose of medicine, though homœopathic to the case, will be injurious."

Having shown, then, that disease is a disturbance of the metabolism of the cell, which, among other functions, possesses that of "selective affinity;" that remedial power depends on chemical action; that infinite dilution increases the power of the drug, lessens the probability of interference with the protective functions of the body fluids, and presents the remedy in such form as to be most readily appropriated,—it naturally follows, as the conclusion of the whole matter, that in the cure of disease, the infinitesimal dose, properly chosen, is more effective than is any other practice.*

In closing, I desire to give my personal testimony to the foresight, the scientific accuracy, the logical presentation, the minimum of error, and the maximum of eternal verity shown by a man who lived in

*I cannot forbear calling to mind, however, an introductory remark, that, in the light of present knowledge, I am doubtful of the value of such attenuation as actually removes the physical presence of the drug. In practice, therefore, I rarely prescribe above the thirtieth decimal dilution.

an epoch of superstition, who practiced during the dark ages of medicine, who knew nothing of the modern laboratory idea; yet his gigantic intellect was capable of formulating a system of therapeutics so accurate in its essential parts that the rest of the scientific world has adjusted and readjusted itself until now it snugly enfolds and perfectly fits every feature of the homœopathic doctrine. Study the modern ideas of disease and the morbid processes as they are now understood, delve in physical chemistry as it is taught in every university of the world, listen to the forensic eloquence of the physicist, the chemist, the physiologist, and the pathologist; then take from its shelf the "Organon of the Art of Healing," written a hundred years by one Samuel Hahnemann, and it will be found that the notes of all these latter day scientists are so attuned that when that voice of a century ago sings its lay to the modern music there is not a suspicion of discord, but in perfect sweetness the whole temple of science is resonant and reverberant in one symphony of perfect harmony.

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